

CLAIMS

1. A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being Cu and inevitable impurities,
- 10 wherein a crystal grain diameter is more than 0.001 mm and 0.025 mm or less; and the ratio (a/b), between a longer diameter *a* of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter *b* of a crystal grain on a cross section
- 15 perpendicular to the direction of final plastic working, is 1.5 or less.

2. A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, 0.005 to 2.0% by mass in a total amount of at least one selected from the group consisting of Ag, Co and Cr (with the proviso that the Cr content is 0.2% by mass
- 25 or less), and less than 0.005% by mass (including 0% by

mass) of S, with the balance being Cu and inevitable impurities,

wherein a crystal grain diameter is more than 0.001 mm and 0.025 mm or less; and the ratio (a/b), between a longer diameter a of a crystal grain on a cross section parallel to a direction of final plastic working, and a longer diameter b of a crystal grain on a cross section perpendicular to the direction of final plastic working, is 1.5 or less.

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3. A copper alloy material for parts of electronic and electric machinery and tools, comprising 1.0 to 3.0% by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by mass of Zn, and less than 0.005% by mass (including 0% by mass) of S, with the balance being Cu and inevitable impurities,

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wherein a surface roughness Ra after final plastic working is more than 0 μm and less than 0.1 μm , or a surface roughness Rmax is more than 0 μm and less than 2.0 μm .

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4. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being

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plated with Sn or a Sn alloy.

5. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Sn or a Sn alloy, and is being subjected to a reflow treatment.

10 6. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is
15 being plated with Sn or a Sn alloy thereon.

7. The copper alloy material for parts of electronic and electric machinery and tools according to Claim 3, wherein the copper alloy material for parts of
20 electronic and electric machinery and tools is being plated with Cu or a Cu alloy as an underlayer, and is being plated with Sn or a Sn alloy thereon, and is being subjected to a reflow treatment.

25 8. The copper alloy material for parts of

electronic and electric machinery and tools according to
Claim 3, wherein the copper alloy material for parts of
electronic and electric machinery and tools is being
plated with Ni or a Ni alloy as an underlayer, and is
5 being plated with Au or a Au alloy thereon.

9. A copper alloy material for parts of electronic
and electric machinery and tools, comprising 1.0 to 3.0%
by mass of Ni, 0.2 to 0.7% by mass of Si, 0.01 to 0.2% by
10 mass of Mg, 0.05 to 1.5% by mass of Sn, 0.2 to 1.5% by
mass of Zn, 0.005 to 2.0% by mass in a total amount of at
least one selected from the group consisting of Ag, Co and
Cr (with the proviso that the Cr content is 0.2% by mass
or less), and less than 0.005% by mass (including 0% by
15 mass) of S, with the balance being Cu and inevitable
impurities,
wherein a surface roughness Ra after final plastic working
is more than 0 μm and less than 0.1 μm , or a surface
roughness Rmax is more than 0 μm and less than 2.0 μm .

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10. The copper alloy material for parts of
electronic and electric machinery and tools according to
Claim 9, wherein the copper alloy material for parts of
electronic and electric machinery and tools is being
25 plated with Sn or a Sn alloy.

11. The copper alloy material for parts of
 electronic and electric machinery and tools according to
 Claim 9, wherein the copper alloy material for parts of
 5 electronic and electric machinery and tools is being
 plated with Sn or a Sn alloy, and is being subjected to a
 reflow treatment.

12. The copper alloy material for parts of
 10 electronic and electric machinery and tools according to
 Claim 9, wherein the copper alloy material for parts of
 electronic and electric machinery and tools is being
 plated with Cu or a Cu alloy as an underlayer, and is
 being plated with Sn or a Sn alloy thereon.

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 13. The copper alloy material for parts of
 electronic and electric machinery and tools according to
 Claim 9, wherein the copper alloy material for parts of
 electronic and electric machinery and tools is being
 20 plated with Cu or a Cu alloy as an underlayer, and is
 being plated with Sn or a Sn alloy thereon, and is being
 subjected to a reflow treatment.

14. The copper alloy material for parts of
 25 electronic and electric machinery and tools according to

Claim 9, wherein the copper alloy material for parts of electronic and electric machinery and tools is being plated with Ni or a Ni alloy as an underlayer, and is being plated with Au or a Au alloy thereon.

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